

Lancashire Sea Fisheries.

CHARLES L. JACKSON.

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Lancashire Sea Fisheries

A Lecture

DELIVERED IN THE CHADWICK MUSEUM, BOLTON,
MAY 24TH, 1899.

BY

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TO MY OLD AND VALUED FRIEND,

ABRAHAM BURROWS, Esq.,

JUSTICE OF THE PEACE FOR THE COUNTY OF LANCASTER,
AND LATE ALDERMAN OF THE COUNTY COUNCIL OF LANCASHIRE,

THIS LITTLE PAMPHLET IS RESPECTFULLY DEDICATED,
PARTLY ON ACCOUNT OF OUR VERY LONG FRIENDSHIP, BUT

ESPECIALLY IN MEMORY OF THE EFFORTS HE MADE
EIGHT OR TEN YEARS SINCE TO OBTAIN A FAIR HEARING

FOR THE FACTS AND A FAIR CONSIDERATION
FOR THE CONCLUSIONS EMBODIED IN THE FOLLOWING PAGES.

AUTHOR'S PREFACE.

“OF the making of many books there is no end.” It is customary, and in many cases very advisable, that anyone who rushes into print should give the public his reasons for so doing. In my case I do so. Firstly, because a strong wish has been expressed that I should publish the lecture I gave under the auspices of the Bolton Corporation at the Chadwick Museum, and I promised to do so, but it seemed to me it would be well, even while retaining the lecture form, to add from my many notes a considerable number of facts suppressed during the lecture, owing to want of time, which I think go far to prove my contentions. I was further induced to do this by the newspaper reports, in which the lecture was cut down to suit space. Proofs were eliminated, and merely the assertions printed. Secondly, because during the time I conducted the Southport Aquarium I had opportunities which are not likely soon to occur again of making many interesting experiments. Those relating to fish culture are, I venture to think, of some importance. They are at present recorded in all sorts of places—Blue Books, *Land and Water*, local papers, &c., and

I think it well to bring the most important into one collection. Whatever may be thought of my conclusions, I leave these observations as my contribution to the great fishery question.

In regard to the scientific staff mentioned, I trust it will be understood that my remarks and strictures are entirely made in their Pickwickian or Fishery sense, and without personality. I have not the honour of knowing any of the gentlemen personally, and have no doubt they are, as most Englishmen are, very estimable men in private life, when not mounted on their scientific hobby-horse and riding the poor fishermen to death; but in their public capacity I think they furnish one additional proof of the wisdom of our great poet when he exclaims, "Proud man drest in a little brief authority, most ignorant of what he's most assured, plays such fantastic tricks before high heaven as make the angels weep."

Since delivering this lecture my attention has been called by Mr. Midgely, Curator of the Chadwick Museum, Bolton, to Professor McIntosh's book on the subject, just published, and entitled, "The Resources of the Sea." Professor McIntosh is a far more able man than I am. He is a recognised authority on these questions, and has devoted his life to scientific studies, while I, busily occupied in my own onerous profession as an engineer, have only been able to devote my leisure hours to the subject. I earnestly hope

that those responsible for the present state of things will carefully read and consider the Professor's volume, and especially the concluding pages, in which he sums up the case.

It is hard to fight against what have now become vested interests, but justice and common sense must prevail, and in time the present advisers of the County Council will be glad for the public to forget the cruelty and hardship they have inflicted on a hard-working and deserving class by their legislation in the dark.

Moorfield, Bolton.

THE LANCASHIRE SEA FISHERIES.

MR. CHAIRMAN, LADIES AND GENTLEMEN,

It may strike many people as rather curious that an engineer in an inland town should be asked to open a Fisheries Exhibition—the two things at first sight seeming somewhat incongruous. However, when they invited me, the Corporation did so on the ground that they believed I was the only man in the district who knew anything about our fisheries. This is not quite correct; but it certainly is to be regretted that more people do not give attention to the subject, and are not aware of the harm that is being done with the intention of increasing our fish supply.

I am at first sight rather in an invidious position to-night, because I feel very strongly indeed, with the fishermen along the Lancashire coast, that they are being harassed and ill-treated by the group of scientists who have obtained possession of the ears of the County Council, and are regulating the fisheries according to their ideas.

When I was asked to open the Exhibition, I explained my views to the authorities, and told them they put me in

rather a peculiar position, for it was customary at these exhibitions for the persons who opened them to praise everything. They pointed out to me, however, that this case was somewhat different, because the Committee who have sent down the Exhibition have sent it to illustrate what they are doing, how they are spending the public money (now amounting to a very large sum, about £3,000 per annum), and to justify their action in treating the fishermen in the manner in which they are doing; and therefore it was perfectly fair, as they were paid by the people, that the people should criticise their action, if they could.

I think before I go any further I should tell you what particular chances have fallen in my way to render me capable of forming an opinion on this question. From being a lad (I should say for quite 40 years), this subject has had for me a most fascinating interest. I was a born fisherman, a hereditary fisherman, I think; but catching a great quantity of fish never had anything like the attraction for me that the study of the habits of fish and the wonderful problems, both of sea and fresh water, had, and I have always made it a subject of keen study. In 1875, when the Southport Aquarium was started, about a fortnight before it was opened, I was asked to join the Board of Directors, and to take charge of the Aquarium, as none of the directors had studied the question of fish culture. I agreed to do so, on condition that I should not be expected

to do anything else, or to serve on any other committee. Before the end of the fortnight we succeeded in opening the Aquarium with our tanks in a beautiful condition; 800 fishes were in them, nearly 3,000 anemones (some of these are still living), and other specimens. The whole of these I caught or collected myself at Fleetwood.

After that time, for fifteen years, I had the sole and entire management of the Southport Aquarium, and not only that, but I caught more than three-fourths of all the fish they ever possessed, and during that time I was intimately associated with the fishermen along our coast, and formed a very high opinion of them.

We had to solve the question of catching the fish, feeding, and keeping them. The work done attracted the attention of Mr. Frank Buckland, Sir Spencer Walpole, Inspectors of Sea Fisheries, and Mr. Archibald Young, Inspector of Salmon Fisheries in Scotland. From almost the beginning to the end of the time I was engaged in the work I enjoyed their friendship, and I constantly gave them such information as I possessed on the question of fisheries. I made Mr. Buckland most of the microscopic observations for his Oyster Fisheries Bill, and I was asked again and again by Mr. Buckland and Sir Spencer Walpole to join them in their enquiries, and to assist them by my local knowledge and my knowledge of the fishermen. I was, therefore, often with them.

The work also brought me in contact with Dr. Day, ex-Inspector of Fisheries in India, and until his death we were close friends.

Again, I had another source of information as to what was being done in America, for I had the pleasure of numbering Professor Baird, the head of the U.S. Fishery Commission, among my personal friends, and was in constant communication with him until his premature death.

I merely mention these facts to point out the opportunities I have had of learning something about the conditions of our Sea Fisheries.

You will agree with me that in a great affair of this sort it is very foolish to pass laws before you know what you are doing. When this Sea Fisheries Bill was first proposed I thought it would probably be a very good thing, as greater opportunities of obtaining information would be afforded.

The County Council having got the powers I was shocked to find that the idea that seemed to possess them was not that information should be sought, but that something must be done to stop some people from doing something; the question was to find out what that something was, but something it must be. Many years ago this same question was brought up. The question of the exhaustion of our Sea Fisheries is practically as old as the hills, in spite of the fact that the yield increases every year. There is I believe

a clause in Magna Charta prohibiting certain nets being used because certain sea fishes were falling off.

What I object to in the management of the Lancashire Sea Fisheries is that there has been no honest attempt made to place before the public and before the members of the County Council the full bearing of the subject. I was utterly disgusted in the earlier stages when I saw the officials taking out fish salesmen and landmen. People who certainly had no knowledge whatever (for even a fish salesman as such knows nothing of fishery questions beyond the market value of different species), were taken out to sea and were shown the effect of a trawl net in bringing up a large number of small fish, and were dismissed with the idea that this was the normal state of things in our Fisheries, and that in a very few years there would not be a fish in the sea.

Now, sir, there are three great laws that regulate the supply of fish in water, both fresh water and sea water, and those three laws are easily capable of demonstration. The first is enormous power of reproduction. The female cod, when they come on the spawning grounds in winter or early spring deposit on an average nine million eggs apiece; the conger eel I note from my own observation deposits from fourteen to fifteen million eggs, and all food fishes are enormously prolific, though the actual number of eggs differs in different species. If the eggs laid along the Lancashire coast only, in one year, were all to hatch and all to grow to adult size,

you could not sail a ship across to Ireland. With this enormous reproduction, therefore, there comes in necessarily the second great law, requiring enormous destruction to keep the thing at a normal limit.

The third law is a very curious one, and I don't think it is well known. We might call it one of retardation of development. I never heard anybody attach proper importance to it. You will probably, some of you who are fishermen, have heard that when a lake or reservoir is made on a small river it is discovered that there are much larger fish in the reservoir than there were in the river originally. If you were to turn a large number of calves into a field, and there was not sufficient food and room for them they would die. In the same way, if you were to set a lot of seeds in the garden, and you set them so close that there was not room for them they also would die. It is not so with fishes, or with most marine and fresh water animals, probably with all. I have tried many sorts, and this special and most curious law affects them all. If the environment is such that there is not room to grow, or if there is not sufficient food, the creatures may remain healthy, but they will be small, they will never grow to their full proportions until the conditions are favourable; the consequence is you will have a large stock of tiny fish. I was puzzled for many years to understand what the meaning of this could be, until it struck me that the explanation was

probably this, that with such enormous destruction being required to go on, possibly the destruction might sometime be rather overdone, and a whole year's brood might be swept off. The vacancy thus created would be immediately filled by those little forms whose rate of growth had been retarded; they would rush in and occupy the vacant space.

Apart, however, from any great convulsion sweeping away a whole year's brood, something of this kind does actually take place. Nature acts just as an intelligent gardener or farmer does. Some crops, such as cabbages, celery, &c., which bear removal, it is found most economical to grow in seed-beds and to transplant. By this means ground can be used for another crop, and as that is cleared, well-grown specimens of the next can be planted out, and so save the time of the larger fields or beds. This phenomenon has a most important bearing upon the fishery question, for Nature says in effect to the fisherman, "Work away, take all you can make any use of, you do not need to wait for another year's crop. I have vast reserves of young well-grown fish ready to plant out. The more you take, the more I will supply."

Nature in the sea has one great advantage. The agriculturist must time his seed-beds so that the young plants will be exactly ready when wanted, but in the sea Nature can hold her stock at any size she likes until they

are required, and thus in her operations, though there is enormous destruction, there is no waste.

Part of this great fact you can demonstrate for yourselves. If you will take common water snails, put a few of them in an aquarium, and allow them to spawn there, you will have at the end of twelve months, provided all goes right, hundreds of tiny snails; but if you take half-a-dozen of these out soon after being hatched and put them in another aquarium, giving them plenty of room, you will find at the end of twelve months that they are full-grown specimens. Anyone who has kept fish in a parlour aquarium must have noticed that the fish do not grow. In the Southport Aquarium we were able to observe this matter very fully. We obtained a quantity of young turbot about the size of the palm of the hand, and placed a number of them in the small table tanks, and a further number in the hall tanks, these latter tanks being about 10ft. square by 6ft. deep. At the end of a year I was struck with the fact that those we had in the table tanks were only the size they were when caught, while those in the hall tanks weighed 3 or 4lb. I had some of these removed and put in the big tank 30ft. long. At the end of another year those in the table and hall tanks were still about the same size; they had made very little growth; but those in the big tank ranged from 8 to 10lb. each. At the end of another year those in the table and hall tanks were still stationary, while those in the large

tank ranged from 14 to 18lb. After this, though those in the small tanks lived some years, they did not make any appreciable growth; they had obviously reached the limit their circumstances permitted. Sir S. Walpole and Mr. Archibald Young were greatly interested in this experiment when in Southport about some salmon experiments I had been making.

When first the Southport Aquarium was opened, I caught at Fleetwood, on the Little Ford Bank, near the Wyre Lighthouse, a number of conger eels; none of these weighed more than 2 to 3lb.; if there was an odd 4-pounder it was an exception. Some of these I had put in the small tanks, and some in the large tanks. Those in the hall tanks grew and attained a weight of 6 or 7lb.; those in the big tank, where they had plenty of room, went ahead at a most surprising rate. At the end of three-and-a-half years one of them died. That fish turned the scales at 69lb. I forwarded it at once to Mr. Buckland, and he had a cast made from it, which is now in the South Kensington Museum. Another died at the end of five years. Unfortunately I was not in Southport at the time, but I went the next day to the Aquarium. It had been thrown in a corner of the hot engine-room for me to see, and being a soft watery fish it would lose much weight under these circumstances in twenty-four hours. Still, the creature turned the scales at 99lb. This fish is also cast, and is in

the South Kensington Museum. Others grew to enormous sizes, but these two are the only ones of which I have a record of the exact weights.

I tried similar experiments with cod, and with exactly the same results, but I could not grow them to more than 8 to 10lb., a weight which they attained in three years, and this only in the large tanks. In the smaller ones they grew very little. They had evidently reached the maximum growth possible in their circumstances. Various flat fish gave similar results, but captivity affected them more. I also tried the grey mullet. I could never succeed in raising them to more than from $\frac{1}{2}$ lb. to 1lb. weight. They seemed more restless, and to require a larger area in which to develop. I, however, retarded the growth of some by keeping them in a little tank until eight years old, when they were only the size of minnows.

Now, sir, to deal with the experiments made by our scientists under direction of the Sea Fisheries Committee of the County Council, and upon which they have founded their legislation. I do not deny for a moment that they look at first sight, and have been represented to the County Council as very shocking, but I think I can show that first appearances by no means prove the case, and that these advisers have presented an utterly false argument, though founded on their own experiments.

Suppose you were to bring someone from the country and take him into one of our mills and into the cellars below, and show him how the yarns were being damped, he might go away thinking us a most immoral lot, and if he were a parson he would preach most violent sermons against us, as has in fact been done by a very eminent minister of religion in Manchester; he would probably advise penal legislation. We know perfectly well that yarns must be conditioned, and that it is as much part of the process of producing them as spinning. If we were to get a Cockney from the centre of London, and take him out to a farm, and show him the farmer thrashing his wheat and sending the bulk of it to the mill instead of saving it and sowing it, and led him to believe that every grain so treated was a plant destroyed, what would he think about it? You could persuade him that it was a monstrous and extravagant proceeding. But misrepresentation of this kind is infinitely worse in the sea. Wheat produces say 100 fold, but the seed, as we may call it, of fishes is to be calculated by a million fold in many cases, and in nearly all our food fishes is enormous, so that only a mere fraction of the young can ever find room in which to grow. This illustration was used by the Sea Fisheries Commissioners in 1878.

In reference to the position of the fishermen, what I complain bitterly of in our sea fisheries scientists is the continual condemnation of the men, and utter misrepresentation

of their proceedings. If you were to read the report of the Sea Fisheries authorities, you would think the men were a set of fiends; that they were simply destroying the contents of the sea for their own will and pleasure, whereas the truth is that, in the first place the destruction is infinitely less than it is represented as being; in the second place, compared with the other destructive forces, the destruction made by fishermen is inappreciable, though alone it might appear to be considerable, and in the third place, legislation does not affect the preservation that it is represented to do, and its cruelty to the fishermen cannot be justified. There is nothing else like it in English law.

When these bye-laws were passed (to demonstrate to you that they were passed by people who knew nothing at all about what they were doing), it was decided that the Superintendent should have a steamer in order to "protect the fisheries." I was at Fleetwood soon after, and happened to be standing on the beach chatting with one of the fishermen, when a pretty little steamer similar to those on Windermere, but such a thing as I never saw on the open sea, came steaming up the channel with a big ensign flying. I asked, "What in the world is that?" The fisherman turned round and said, "That is the Lancashire Sea Fisheries Steamer." I said, "That?" "Yes." "You do not mean to say that is their idea of a steamer for investigating

or protecting the sea fisheries?" "Yes, sir," he said, "that is their idea."

As he knew the sort of weather I was in the habit of going out in, I said, "How would it stand our work?" He laughed as he replied, "You would knock it to pieces in a week. But they do not intend to go out your sort of weather."

They did after a while find out their mistake, and sold the steamer. They then bought one which can face a bit of weather, and so at a great monetary loss to the county remedied one mistake which need never have been made. I do not give them great credit for this, for the information was knocked into them by old ocean, who showed them that their own lives were in danger, and however the fishermen may fare, we must all see it would be a serious matter if a Professor and Sea Fisheries Superintendent "ran some risk of being drowned." They have never shown any inclination to acknowledge that their bye-laws were made on the same kind of information that induced them to buy their toy steamer, but in the same ignorance in which they bought their steamer their regulations were made and are enforced to-day.

We will consider first fisheries proper and shrimping (cockling and musseling I will deal with later). I will also take the scientists' reports as far as the experiments are concerned, and assume that these were correct. But I will try

to put the deductions to be drawn from their experiments into the light of what actually takes place, and the lessons I think we may gather from them. I speak from the experience gathered in hundreds of expeditions with the fishermen in their own boats, using their own tackle, and using it as they ordinarily do, not as used on the "John Fell," the C.C. Fisheries Steamer.

I am obliged for a text to go back to Professor Hardman's report for 1894, those for 1895-96-97 being absolutely barren of any fact really adding to our knowledge, but consisting of learned descriptions of the structure of certain small crustaceans, and a series of beautiful sketches of their anatomy, and various articles on scientific (principally microscopic) subjects; they are in fact articles on these subjects published at the expense of the county; if they were reports of research endowed as such, we should have no cause of complaint, but as the report of men harassing the fishermen as they are doing, they are both useless and misleading. On turning to the 1894 report we find on page 49 a typical description of experiments and deductions. We give the report in full.

"The statistics of hauls taken during the past year from the steamer show once more, if any showing is still needed, that that destructive engine, the shrimp trawl, brings up along with a miserably small number of shrimps an astonishingly large number of young food fishes. On November 2nd, off the Ribble estuary, with

five quarts of shrimps were taken over 5,000 undersized food fishes. On the same date, off Blackpool, with one and-a-quarter quarts of shrimps were 10,000 fish. On October 24th, in Heysham Lake, with two quarts of shrimps were 4,000 plaice, about four inches long, and so on. Of course, it is satisfactory to know that there are so many young fish on the ground, but it is deplorable that for the sake of a quart or two of shrimps several thousands of young fish should run some risk of being sacrificed.

BAR SHANK NET EXPERIMENTS.

These experiments were carried out by Mr. Dawson for the purpose of determining whether the destruction of small fish caught while shrimping could be decreased without affecting the number of shrimps taken. In carrying out the experiments an ordinary shank net and a shrimp trawl were worked over the same ground, along with a modified shank net having a bar fixed to the frame about three inches off the bottom, to which bar the lower part of the net is attached, the three being worked simultaneously, so that the experiments might have a fair trial. As stated in the introduction, these experiments have, so far, supported Mr. Dawson's idea as to the fish caught in this net being fewer in number than those caught either by the ordinary shank net or the shrimp trawl, but it would perhaps be better that the experiments should be carried on for a further period before any definite opinion is expressed on this matter."

The statistics given show enormously in favour of the shank as against the trawl.

Now, sir, I think any person not acquainted with the subject, to whom this report was presented, would assume this to be the normal state of things in shrimping, and that this was a fair representation of what took place, and that the shrimping industry was a miserable business. We may also conclude that we are to understand that Mr. Dawson made the wonderful discovery that a shank net is much less destructive than a trawl. I say nothing about Mr. Dawson's improved shank. The report admits that the experiments which apparently showed a slight advantage over the ordinary shank net were not conclusive, and if they were experiments in fair or moderate weather on a steamer, they are not much guide to results that would be obtained in sailing craft, where the slightest complication may make a net useless, and where it is as much as ever the men can do to handle the boat and nets.

In regard to the shank net and these assumed discoveries, would it not have been well if Mr. Herdman had placed the whole truth before the committee and told them that the shank trawl was invented (I believe before Mr. Dawson was born) by the fishermen in order to reduce the intolerable nuisance of catching small fish ; and that its effect was well known before County Councils and Sea Fisheries Committees were thought of. I myself explained the action of it, and the reason why it was used, when practicable, to the Commission who made the enquiry in 1878, and my evidence

and the facts, were embodied in their report to Parliament, which is now before me. Unfortunately, however, the shank net can only be worked in certain localities, owing to the nature of the sea bottom, and in other localities there is no resource but the trawl net.

Shrimpers will not use a trawl when a shank will do. I cannot give you a better proof of this than that when I wanted to get small fish for the Aquarium, and wished to use a trawl on grounds where a shank could be used, I had to hire the boat, &c., by the day, whereas if I was content to take such fish as the shank nets got, I could go out as I liked, the men taking the shrimps. The reason assigned was that we should catch too many small fish to pay. If Mr. Dawson could invent something still better, it would be such a boon to the shrimpers that they would, I think, almost forgive him for the injuries they suffer from now.

Now, as to the results of hauls, the general impression from this one-sided report must be that shrimp-fishing is a miserable, petty business, carried on at a ruinous cost to other fisheries. Mr. Dawson does not tell the Committee that shrimping employs far more men, and brings in far more money to the fishermen and their families than the deep-sea fisheries off the Lancashire coast, and that, therefore, it is an industry not lightly to be interfered with. But serious as this omission is, it is trifling compared with the

gross misrepresentation of facts in actual fishing which we are left to infer from the report. No shrimper would, or could, fish under such circumstances as are reported. I have, scores of times, been with them when such a haul was made, and the consequence has invariably been that they gave up fishing and moved off to try their luck elsewhere, where young fish were not so thick on the ground, this not from any sentimental kindness to the young fish, but as a pure matter of business. The shrimps would be worth about fourpence per quart to the fisherman, so in such a case as is reported, for the hard work involved in a long trawl, as well as an hour or more spent in picking the few shrimps from a mass of fish, they would receive fivepence, and out of this wear and tear of boat, sails, and net would have to be paid.

If we have shewn what these experiments do not prove, let us see what they do prove. We must in justice to these gentlemen assume that their hauls were in their opinion fair examples of the shrimp fishing. If so, we have genuine cause for alarm, for they show such an enormous abundance of young fish forms as to make it certain that our shrimp-ing population must starve, for under such conditions as are reported they cannot possibly live themselves, much less support wives and families. If the reports are not strictly fair, but if they still represent in some degree, though exaggerated, the present state of things, the shrimp fishing is

in a very parlous condition. If the reported examples are not fair examples they destroy all our faith in the authorities. The truth is that such hauls *are* made, and unfortunately for the shrimpers, are too often made to be pleasant, but they are by no means fair or ordinary examples, though they occur often enough to prove that young fish exist in numbers many times more than can possibly develop. These young fish of two to four inches long are those which have escaped the dangers of babyhood. They are not the miserable little larval forms which Professor Herdman dignifies by the title of "fry," and which he proposes at enormous cost to hatch and distribute. "Carrying coals to Newcastle" is sober common sense compared with such a proceeding as this. Further, these gentlemen have the grace to admit that in spite of the alleged destructiveness of shrimping, it was satisfactory to find such enormous quantities of young fish on the grounds, that even these are not sure of being destroyed, only "they run some risk." They must be aware that in the normal course of things nearly all the young fish go overboard as soon as the nets are cleared, and that flat fish are little the worse. Those which may die are not lost. It merely means that other forms of life below water get a meal a little easier than they otherwise would do. To me and to the fishermen it is of infinitely greater importance that the wives and children of the men should not starve by the action of the Fisheries

Committee than that a few small fishes should "run some risk" of dying a day or two earlier than they would have done in the ordinary course of nature.

Having, I think, fairly dealt with the shrimp question, let us look for a minute or two at the restriction in size of mesh in trawl nets.

First of all, we must understand that in a trawl net it is to the fisherman's interest to use as large a mesh as he can profitably do, for the larger the mesh the easier the draft is through the water, the better the trawl keeps the bottom, and, owing to the greater speed, the more fish are caught. But this is qualified by the necessity of having a mesh small enough to keep all the fish worth having. To shew the necessity of interfering with shrewd, practical men who know their business, the committee show two jars, one supposed to illustrate the average size of fish taken with seven-inch mesh, the other with four and a-half inch mesh, which would escape through the larger, and, as they say, "remain to grow to adult age." If the fish in the smaller jar are a fair average, in the gross some would be larger, some smaller. Many of these are big enough to cook, and are far more delicious than larger specimens.

But I see with surprise that about half the bulk are young whiting. Surely the scientists must know that not one of these could possibly wriggle through the net and live. While the smaller mesh retains them to be made use of, the

larger kills them and leaves them for the crabs and shrimps. How do I know this? By repeated experiments and repeated disappointments. Salmon, sea perch (bass), grey mullet, and similar hard scaled fishes with scales firmly attached, can go through a net and can stand some pressure, but these members of the cod family are so tender that the slightest pressure is fatal. When collecting specimens, I always took all I possibly could with hook and line, to prevent any crushing, and such as we were obliged to obtain by trawling were got by making special drags, only keeping the net down ten minutes and then lifting it. Even with this care, impracticable in fishing for a living, the mortality was enormous. The experiments tried on board the steamer of putting them in tanks for two or three hours, and because they were alive at the end of that time assuming they were uninjured, are useless. So temporarily tenacious of life are they that I always took them alive to the Aquarium, but considered myself very lucky if five per cent. lived a week. The bulk of them were dead next morning, while of hook-and-line caught fish I rarely lost five per cent.

One species of cod, the "Power," (*Gadus Minutus*) would not stand the handling needful to take them off the hook. These are too small a member of the cod family to be much used for eating, but they are exceedingly beautiful in an aquarium, far more so than any other of the family. At last I took a pair of forceps to sea with me, and lifting

the line out of the water when I caught a fish, I grasped the lower lip of the fish with the forceps while I disengaged the hook. I then dropped the fish into the water of the carrier. When the fish arrived at the Aquarium the carrier was lowered into a tank and the fish allowed to swim out. Then and only then we succeeded in getting the fish to live. Such facts as these, I think, clearly show that the restrictions of the Board effect no good, but do actual harm, so far as round fish are concerned.

Now about the soles and plaice. These fish are so tenacious of life that when collecting for the Aquarium we could, when pressed for room in our carriers, carry the fish in a box, simply covering them with a little seaweed. Without any other care I have had them alive a day on the boat.

But what takes place on a fishing boat in actual fishing for a living, not when playing on board a steamer? As soon as the net is hauled the catch is looked over. What the fishermen can eat or make money of is picked out, the rest go overboard. So inveterate is this custom, that it is often difficult to get the men to wait until one can pick out subjects of scientific interest. Over and over again I have had to stop them, while they fidgetted about with shovel and broom. Any one who has asked them to bring in some of their rubbish to examine will know how difficult it is to induce them to preserve it. If you, sir, had been on board

fishing boats as much as I have, you would have seen the reason for immediately getting rid of all slippery substances from the deck. When the wind blows a bit, it is as much as you can do to keep on your feet, and handle the boats and nets with the deck clean.

Considering these facts, and the strong practical reasons named above against using too small a mesh, why should a group of scientists presume to dictate to shrewd business men how to carry on their business, and why should they be armed with such monstrous powers? What is the effect of this absurd legislation? Take their own statements in regard to the Blackpool closed ground.

“When it is considered that from 70 to 90 boats used to be employed shrimping on these grounds (Blackpool Closed Grounds), each boat making from four to five hauls on each tide, it will not be wondered that the Committee closed them, nor can it be denied that the closing must be of immense benefit in the protection of undersized fish.”

What about the wives and children of the poor fishermen? Two men at least would be employed on each boat. Could any possible benefit accruing to the deep sea fishers compensate for the depriving all these men of their living? But this is considered to be a trifle when put into the balance against “some risk” of immature fishes being killed.

Let us consider for a minute what this really means. Supposing the boats earned on an average only £3 per

week, that is not much more than £1 a week each for the men after allowing for wear and tear, depreciation, &c., and as fishing is a highly-skilled labour, I think everyone will admit that this very much understates the earnings. But this gives us £12,480 per annum as the value of the harvest of which the 80 boats have been arbitrarily deprived (I take 80 as midway between 70 and 90), and the country, of course, has lost food to this value, and for no purpose whatever except that large fish may have a grand time feeding on what, together with themselves, rightfully belongs to the fishermen. The harvest, however, of which the men have been deprived would have been mostly shrimps, and these employ the fishermen's families in preparing them for the market, in shelling the small ones for potting, &c., and in retailing the large ones. During these processes the shrimps nearly double in value. It appears, therefore, at a reasonable estimate, on Professor Herdman's own statistics, that this enclosed area yielded the fishermen and their families an income of nearly £25,000 per annum, so that by his beneficent oversight they have, by this time, been robbed of some £150,000.

No wonder Dutch shrimps are sold in Southport since this authority was established in presence of such a statement as this in the report. No wonder the fishermen feel they are cruelly and wantonly shut out from the harvest God has given them, and that they try now and then to

snatch a bit of it. The wonder is that they are so law-abiding. But if the present persecution continues, and repeated prosecution and punishment for what is no crime is maintained, the character of the men must deteriorate.

If, in addition, we reckon the loss to the fishermen through restriction of mesh, the heavy loss to cocklers in their having to submit to a gauge arbitrarily imposed upon them, when political economy has fixed one a little smaller (the difference is not great, but one is costly to the county and prevents the cockler earning a proper living, while the natural limit is equally fixed, works for nothing, and causes no irritation), we cannot, I think, avoid the conclusion that even the heavy cost of this department is a trifle compared with the tax levied on the fishermen. It will be a moderate estimate to put the loss at a quarter of a million of money since these laws were passed.

Professor Herdman's salve for all this is the breeding and feeding of shrimps. And if he would cease prosecuting the fishermen until he had satisfactorily accomplished it, and provided the remedy, we should have nothing to complain of. He suggests "as well worthy of serious consideration" a trial of artificial shrimp culture in enclosed areas, with a view to providing some substitute for the present destructive method of shrimping, and proposes to feed them on offal. Speaking as a naturalist with

some experience of feeding marine animals I assert that this could not be done at any cost. The Professor talks of offal, but though we may speak of certain animals as scavengers, the various inhabitants of the sea are so fitted into one another that they are mutually dependent on one another, and for one form to feed on what is the natural offal of other species is a very different thing from pitching a heap of what we are pleased to call offal into the sea. Marine animals are dainty feeders in their own line. Professor Herdman's creek would soon become a filthy abomination if offal were thrown in to feed his shrimps. It is a costly job to find marine animals suitable food on a small scale, when their value as exhibits is many hundred fold what it could be as food; on a commercial scale, and one of such vast magnitude, it is impossible. It is really difficult to believe that the Professor is not poking fun at the Council. But it is similar to the many Jules Verne-like proposals set forth solemnly in the fishery reports. Shrimps are not found of marketable size in little creeks. Existing as they do in myriads along our coasts, no inhabitant of the sea seems to require more of the invigorating influence of the mighty tides that sweep along our borders. In the Aquarium we found that of all edible creatures we could keep the smallest weight of shrimps in proportion to water, and they required a heavy circulation to keep them healthy.

The Professor writes lightly and cheerily about enclosing a space "with wattles," but to shut shrimps in, especially in their early stages, the fence would have to be the finest gauze. Has the learned Professor ever calculated what rearing and feeding our shrimp harvest would cost? Take the piece of ground alone which he has been instrumental in so lightly closing off Blackpool—closed as being an insignificant matter to the fishermen. Taking the boats fishing there as 80 (he says 70 to 90), in order to make shrimping pay, the boats must take at least 40 quarts each per day. At 4d. per quart this would only leave 13s. 4d. per day to pay two men and wear and tear of boats and nets, so I think it a low estimate. If the boats fished five days a week for 40 weeks this would mean 640,000 quarts of shrimps from this bit alone. How are we to enclose an area like this, and artificially feed such a stock as to yield a crop of this kind? If it were possible to erect sea walls to enclose areas sufficient to rear our shrimp crop, the revenues of Lancashire would not pay for them, and it would take an army of men to catch and provide food. Speaking as an engineer, even if we were prepared to sink untold millions in such a project it could not be done. The tides would laugh at such utter folly, and where the profit could come in, when Nature has provided so bountiful a harvest for the mere taking of it, is beyond my comprehension.

Having considered the size of the mesh, let us for a moment look at the limitation of length of trawl beam, and width of cockle rake. To obtain any foundation to argue from in regard to these, we must admit that trawling does considerable harm, and that some regulations are needed. For argument's sake alone we will allow this, but admitting it, and without it the laws are absurd, are we any better? No one will pretend that a wider trawl or wider cockle rake does more harm than a narrower one in proportion to the whole work it does. Therefore, if we admit the necessity of working with a trawl or a cockle rake at all, the only possible object of legislation is to prevent the individual fisherman or cockler endowed by his Maker with more skill or strength than his fellow from using the same, saying to him in effect, "Yes, we know your Maker gave you more strength and skill, and intended you to excel your fellows, but He made a great mistake. Be thankful we are here to repair the blunder." Even admitting the argument that the harvest is limited, which we think the Fleetwood instance named later on,* supported as it is by much other evidence, proves groundless, there is no reason why a man stronger or more skilful than his neighbour should not obtain all the advantage his strength or skill gives him. It is the most elementary principle of political economy that he should be allowed to do the best he can, and so stimulate his fellows

* See page 45.

to renewed efforts. The harvest of the land is limited as is the area of land, but we never think of saying to the successful farmer, "You must not farm more than a certain amount of land, nor use more than a certain power of machinery because you will get more than your share of the harvest," but in fishery matters our legislation during the last fifteen years is, as I have said, like nothing else in English law. The Law of Nature, that every variety whether of man, beast, bird, or fish has a constant tendency to revert to an original type receives from this a valuable illustration. It is well known that sons of savage chieftains who have received in Europe a civilised education often on returning to their wild homes revert very much towards the ancient practices of their tribes. A savage everywhere is delighted to clothe himself in the garb of civilisation, but he remains a savage underneath. And so we find that a high scientific education is after all only skin deep. Beneath all is the savage or the mediæval mind, which only needs opportunity to break forth and astonish civilisation by acting on the worst lines of mediæval thought. This may be to some extent explicable, as it is a well-known fact, proverbially so, that very high scientific knowledge and the absorption of the mind in pursuit of such studies, whether mathematics, theology, natural science, or any other branch, often withdraws a man from the work-a-day world, so that he becomes unpractical.

But what must we say when a County Council acting on scientific advice propose, and the most enlightened Parliament that ever existed legislates, on these lines, says in effect to the superior fisherman, "We know you are more skilled than your neighbour, we know that Providence intended you to excel, we know that it is for the general good that every man should do his best for himself, and that by this means the nation progresses. We also know that you are a trained fisherman by your own and hereditary knowledge. You are best fitted to succeed in your own line. We know your business is of vital importance to the nation, and as population increases will become more so, and it is for the good of the commonwealth that you should succeed. But this is a fishery question; it is governed neither by the ordinary rules of political economy nor yet by common sense, so if you wish to play your part in life, wish to rise as you were intended to do, you must abandon your base, wasteful to yourself and the nation as such a process is, and recommence your life in some other sphere, for if you remain in your present calling your ambition must be limited. You can either be a 30ft. trawler, a 13ft. shrimp, or a 12in. cockler, but beyond these you cannot rise. If you are a cockler and want to know how much money a cockler ought to earn, or how many cockles are 'plenty'* for you to get, you must

* See page 39.

apply to Bailiff Wright." Providence and the laws of political economy make such a fearful mess when they tackle fishing questions that we have put a water bailiff on to manage this part for them. It is fortunate that in this capacity we have such an incarnation of wisdom. The only explanation of all this is that the subject is so obscure that the gentlemen who compose the authority feel out of their depth, and trust to their scientific advisers. But it is a serious responsibility to plead this. I hope by the time I have done to show you the misery that is being wrought, and I am sure you will agree with me that it is not too much to ask these gentlemen to study the subject, and not to trust to such wildly unpractical advisers.

In the Exhibition of the Sea Fisheries Committee you have a collection of what is supposed to be the food of fishes. I will not weary you by dealing with them all, I will deal with the cod as a fair sample of the whole. They have put there two or three crabs, and a shrimp or two, and something of that sort. It is, of course, to the interest of their case to minimise the other destructive forces of Nature, and magnify that of man. They say that is the result of examining the contents of cod stomachs at the Liverpool Laboratory. Very well, possibly it may be so. They ignore the fact, well-known to all fishermen, that when fishes are in extreme danger, say in a net or caught with a line, they are in the habit of

disgorging all the food out of their stomachs that they can. If any of you have fished for pike you will probably have had ample proof of this. It is a mechanical process, and, of course, depends on the food itself whether it can be quickly discharged. If the fish have been feeding on other fish they will be easily parted with, but such food as is here shown would be very difficult to throw up, as it is so full of points and angles to anchor by. The stomachs, therefore, when examined in a laboratory would contain such matter only, but only a small proportion of the fish food. But that this is a true representation of cod food I utterly deny. All members of the cod family are enormously destructive, and they alone, amid all the other agencies, destroy an amount of small fish by the side of which all that man does is a mere trifle. Hundreds of times I have seen this disgorging process, and, with most trifling exceptions, the food parted with was always fish. In addition I have had to feed large numbers of these creatures for years, and have done so with the greatest success, always using fish for food. The avidity with which it was taken from the first showed how palatable it was. Further, no fisherman around our coasts would dream of baiting with such subjects as are shown in the bottle in the condition shown. It does not appear to me that these are the actual contents of the stomachs, for the digestive process is so rapid in fishes that if they were,

they must show evidence of it, while these are perfectly free from any such trace. It appears to me that they are simply whole animals of similar species to those found. If so, they are of no value whatever as evidence. We should have the real contents of stomachs.

To give an actual illustration of cod feeding. The curator of the Aquarium once reported to me that a fisherman had brought in an enormous cod which was the greatest scarecrow he had ever seen. It ought to have been from 25 to 30lb. weight, but was only about 9 or 10lb., it was in such an emaciated condition. I went to look at the fellow, and I found he was suffering from a very curious thing which does not seem to have attracted the attention of the fishery scientists. When you catch fish of the cod family in the sea they are often blind from a sort of cataract over one or both eyes. One day when I was long-line fishing with Mr. Greenall's steam yacht, kindly lent me for the purpose, I took special note, and 10 per cent. of those we caught were partly blind, while 5 per cent. appeared totally dark. This one was quite blind. We had just received a quantity of herrings as food for the seals. They were not of the largest size, but were good marketable fish bought in the ordinary way. We threw one in. Blind or not blind, the cod recognised the presence of food, seized and swallowed it. We tried another, and

another, and not until he had disposed of thirteen herrings did he cry enough. Perhaps you may say it was because he was hungry that he took fish, but at the same time we had in the tank a shoal of ten or twelve splendid cod, averaging fully 20lb. weight each, and in prime condition, on which we experimented. Shortly after we had a big haul of small flat fish. As we did not want them in the hall tanks, I told the men to take the fishes and pour them into the big tank to see what would be the result with the big cod. They recognised the presence of the flat fish immediately; their lethargic condition was thrown off instantly. You could scarcely credit that they were the same fish which had been swimming so quietly and solemnly round the tank; they were now so full of animation as they dashed wildly after their prey. Many were caught before they reached the bottom, and those that survived showed clearly by their actions that they, too, grasped the situation, and knew well enough that crustacea are not by any means the main food of the cod. They instantly covered themselves with sand and apparently disappeared. The cod, however, knew better. They commenced to hunt for them, carefully and systematically quartering their ground as a well-trained pointer would do, and affording a beautiful illustration of the use of the curious "beard" possessed by many members of the cod family. By-and-bye, one of them, by means of this

feeler, detected one of the youngsters and put it up. Away it went full speed, followed by one, two, or three of the huge monsters. No greyhound fancier ever saw a better bit of coursing as the little chap doubled and turned with the greatest agility, while over and over again the great lumbering cod overshot their mark, and the little fish went to earth, only, however, to be again routed out and hunted until not one was left.

Perhaps when Professor Herdman's fantastic dream of the time when we shall not hunt our sea fish, but shall feed and rear them as we do our cattle is realised, we may see a new sport introduced, but I fear we shall not live to enjoy it, for as a preliminary to even beginning to study seriously how to provide at a commercial price the millions of tons of food that would be required (to say nothing of the embankments to keep the fish in, which would cost more than the Panama Canal, if they could be built at all), our meteorologists must first not only understand the great laws that regulate wind and water, frost and heat, but must be able to control them, and work the great forces of Nature at their bidding, or all the other would be liable to destruction in a moment.

As our meteorologists have made so little progress with this first trifling step, it will be a long time before this state of things is brought about.

So far from crustacea in the condition shown in the specimen bottles being the normal food of fishes, we always kept plenty of small crabs in heavily stocked tanks to act as scavengers and eat up any waste morsels of food that might otherwise have decayed and polluted the tank. I never noticed the fish touch them except when they had cast their shells and were "soft crabs," and only in this condition have I ever seen a cod disgorge them.

If we turn from these fishes, foods, and meshes to the rest of the Exhibition, what do we find? A common seaman's telescope and compass, supposed to possess some special merit because a fishery officer uses it; some fancy badges worn by the fishery officers when hunting and harassing the fishermen, and a large series of brass instruments of torture for the fishermen (called gauges in the catalogue). I think I have shown in regard to size of mesh, and later on shall try to do in regard to size of cockles and mussels, how Dame Nature and the laws of political economy have provided absolute gauges which cannot be violated by the fishermen except at their own cost—gauges which work without cost and without irritation, but to our scientists these forces are hum-drum, old-fashioned, so they have applied their intellects to invent something better, and we are called upon to gaze in admiration upon these proofs of their wisdom. It is true they differ very slightly from the others. It is

true also that they are enormously costly to work, and they cause the maximum of irritation and trouble. But still we are supposed to welcome such improvements on poor old Nature and political economy. In the whole Exhibition, in return for the thousands of pounds spent by the Fisheries Committee, there is not one solitary fact or bit of practical information which was not well known and recorded twenty years since. Not one solitary proof of any good done.

You will note I speak warmly about the fishermen. I know them. I have spent scores, nay, hundreds of days, and often nights, alone on the sea with them, and have been in their confidence, and have learnt to understand them. Their occupation differentiates them from landsmen, and a landsman has difficulty in understanding them, but once get over this difficulty and they will compare very well indeed with any of our working population. I speak with deep feeling on this question. I had a crew of four men whom I employed when at work, and four more decent, obliging men I never had as companions. Three of them were teetotalers, the other a very sober man. At one swoop I lost them all. They were all drowned at the post of duty when the Southport and St. Annes lifeboats were wrecked. These, sir, are the men now being hunted, prosecuted by the score, and made into criminals for fear a few small

fish should run some risk of being destroyed. The work goes on swimmingly. In the first six years of its history, as proudly set forth by Mr. Dawson in his report, 390 of these poor fellows were prosecuted, and made to pay in fines and costs £517 5s. Since then I cannot discover the amount extorted from them, but in 1897 no less than sixty-two were hauled before the magistrates, while in 1898 the number was eighty-six. It sickens one, and makes one despair for humanity when we reflect that these are not drunkards, thieves, or rioters, but the most independent, courageous, law-abiding working class we have, and they are so treated because they do not recognise the right of faddists to take their wives' and children's bread from them, when not one single fact is in evidence to prove that the enormous sacrifices they have been made to suffer have done a single pennyworth of good. "Deplorable" it is certainly, but the deplorable part is not the part named by Professor Herdman.

To deal now with the cockle and mussel industry, for it is hardly a fishery in the ordinary sense. At present the cocklers around Morecambe Bay are petitioning the Board of Trade for some relaxation of the oppressive Bye-Laws, on the ground that they cannot make a living, and they made a most reasonable proposal that the Committee should send a deputation to see the work, and judge for themselves, but as reported in the *Manchester*

Guardian of May 17th, 1899, on the sole evidence of Bailiff Wright, who asserted that the cocklers were making plenty of money, the Sea Fisheries Committee reported to the Board of Trade that there was no ground for their petition. I do not know Bailiff Wright, but should certainly infer that he is to the Lancashire Sea Fisheries Committee what the world-famed Bumble was to the *Guardians*. He evidently regards the cocklers in the same light that worthy regarded the paupers, and is equally astonished when "Oliver asks for more."

Assuming that my estimate is correct, I don't blame Bailiff Wright. Bumble was the natural product of mistaken and bad laws administered by men out of sympathy with the pauper, and the frame of mind of Bailiff Wright is exactly what might be expected in the subordinate officials from the Sea Fisheries Bye-Laws administered by the present staff. I give the extract from the *Manchester Guardian* report of the meeting—

"The Clerk stated that a petition had been received from the fishermen round Morecambe Bay praying for a relaxation of the Bye-Laws with reference to the size of mussels and cockles, as under present conditions they could not make a living in the winter months. Bailiff Wright, questioned by the Chairman, said the fishermen took mussels in plenty even in the winter, and it was resolved to inform the Board of Trade that there was no ground for complaint."

Let us examine the question.

In the first place we must grasp the fact that an enormous number of cockles exist. Every person outside the trade whom I have asked to guess the weight of cockles taken annually out of the sand of Morecambe Bay thought they were going to an extreme in guessing four or five tons. Now, sir, twenty years ago, as well as those used on the coast or taken inland by hawkers, estimated at 25% of the whole, the railway companies took from Morecambe Bay alone 3,000 tons per annum of these valuable food molluscs, and they probably take more to-day, as twenty years since the beds were not fished to the limit of their capacity. This does not include the Southport shore, from which the crop is enormous.

At this time, at the request of the Commissioners of Fisheries, I made a series of examinations and experiments on cockles. These were not a complete life history as there was, and still is, a missing link, but they were sufficient for the purpose, and proved beyond all doubt the enormous reproductive power of the cockle, and that in consequence in order to leave room for a certain proportion to attain full growth, an enormous destruction of immature fish must take place. This we find is the case, and to an extent almost beyond the power of man to estimate. Legislation was made on the ground that cockles were taken so small they were valueless, and returned nothing to the cocklers. I was surprised at the weight attached

to these absurd statements, and I would respectfully ask any member of the Sea Fisheries Committee to go on the cockle beds, gather a sack of cockles, convey it to the railway station, receive nothing for it, and then say how long they would like to continue such an unprofitable job. If in addition there were a wife and children clamouring for bread at home, would not the cockler speedily find something else to do, or "come on the Parish."

I do not deny that the cocklers, like anyone else engaged in the grim struggle for existence, may occasionally over estimate the demands of the markets, and send up too many cockles, when naturally the finest specimens will get the advantage and there will be a loss on the smaller, but that it is the regular practice of cocklers to deliberately waste their energies in undergoing the enormous labour of getting unsaleable fish is too absurd even for argument, though it may appear reasonable to pure scientists.

The question then resolves itself thus : is it economically wise to take cockles a little less than at present allowed, and so relieve the cocklers from their present trouble, and leave economic laws, which happily work free of cost, to settle the exact size. I think if we examine the destructive methods of Dame Nature, we must conclude that the cocklers may safely be left to her government.

A very able correspondent of "Land and Water," some twenty years since, from an examination of the contents of

the crops of a single species of wild duck, the Scoter, or Black Duck, concluded that a flock numbering 1,000 of these birds would destroy per year sixty tons of cockles. He found twelve or fifteen cockles in each crop. Assuming that they eat about thirty a day, which would be a very moderate calculation, and allowing for their absence during the breeding season, this would make some seven million cockles, equal to about sixty tons. The ducks obtain them by following the tide in, and shovelling the cockles out of the loose, sloppy sand. I have followed the writer's observations, and consider he is rather under than over the mark. However, I have seen this one species of duck in such quantities that 1,000 might easily have been taken away and not made much difference.

Another bird which exists in thousands in Morecambe Bay, the oyster catcher, is responsible for an enormous destruction of cockles, and they form a large portion of the food of sea gulls of many varieties. These are part of the destructive forces at work when the tide is out. When it is in, countless myriads of plaice and other fish are feeding on them. Any such caught on the banks will be found to be gorged with them, and from their multitude it would be well within the limits to say that the crop that man takes is a small quantity of the whole; and as man is incessantly taking the plaice and other destroyers, it almost follows that to allow a fair proportion of cockles to grow to

a fair size he should do some of their work. This, however, I do not believe, as the three great laws of nature I named at first will keep things right.

The destructive forces mentioned are, however, not all. How do we know? The answer is fairly simple. All shell-fish destroyed by birds or fishes will have the shells parted with broken to fragments. The birds either break up large specimens before eating them, or swallow the small ones whole, when the gizzard crushes them. Fishes crush them with the strong teeth they possess in their throats, but in addition to this, thousands of tons of whole shells are washed up by the sea, the fish having been destroyed by lower organisms such as the star-fish, whelks, &c., which feed upon them.

If we allowed the cockle-beds to rest, what would be the result? Nature would either increase her destructive powers, or the average individual growth would be retarded, and though there might be found a few larger forms which had survived the influence of the destructive forces to some extent, there would be no appreciable increase to compensate for the enormous loss. As well might a farmer refuse to milk his cow for a week, so that she would have plenty of milk at the end of the time.

The more man takes, the more room he leaves, and the more will grow to full size. Of course, I am arguing from the condition of things on these extensive banks. Laws

applicable to little fish-ponds, or small gardens, do not apply in the ocean, though the sea-fishery officers do not seem able to divest themselves of their petty ideas. If the cocklers are left alone, no more cockles will be taken than Nature can afford, for when it does not pay to get them, cocklers will obey the laws of Nature and cease to waste their time; but I feel sure if there was demand, the beds would yield a still larger harvest.

So much for cockles. Let us try to see how the mussels are affected. But before dealing with them I should like to diverge a little, for, connected with this part of the subject is an interesting phenomenon that occurred some years since, and one which is occurring now, which I should like to mention. Also I think something could be done with the mussels, but not on the Fishery Board lines. It is protection, not prosecution, that is required in this case.

The cry of damage to the fisheries by over-fishing is as old as the hills, and will, I expect, always continue. For some reasons not as yet understood, but which there is little doubt are as much beyond the control of man as the ocean itself, fisheries ebb and flow very much indeed; for this reason a mere increase or decrease of crop is no proof of success or failure of any human laws. Whenever the ebb comes, the cry is over-fishing, destruction of fry, &c.; until the flood comes again, when everybody is so

busy and happy that the lean years are forgotten. These ebbs and flows generally cover a fairly long period of time, a new generation to a great extent arises, and past history is lost in the present.

When I was a youth very large quantities of haddock were brought into Fleetwood by the trawlers, and they formed a considerable portion of the catch. The quantity gradually fell off until in the latter seventies and the early eighties, the haddock fishing was extinct, and not a fish was caught. This could not be ascribed to the poor shrimpers, for I never saw or heard of a young haddock being caught by them during all my fishing, and I am sure no quantity could have been, or I must have heard of it. I offered handsome rewards for any that could be obtained, as we wanted them for the Aquarium tanks. After several years, however, and happily about three years before the present officials got to work, the haddock began to re-appear. The first year they were very small, better the second, and they improved until they again became an important part of the catch. They have so much increased in quantity that so far the present year (1899) is a record. They form at present such an important part of the deep-sea trawl fishing from Fleetwood that, if they were not there, the results would be very poor indeed. In size, however, there is a little falling off this year. Whether it portends the decay of the fishing once more I cannot say. I say it

was happily before the present Board was established, for it proves that their proceedings had nothing to do with it.

In connection with the re-appearance of the haddock, however, a fact of stupendous importance has taken place, and a witness appeared on behalf of the poor fishermen whose evidence I do not think even our scientists can neglect or misinterpret. Dame Nature herself has stepped into the arena, and with one grand operation has flatly asserted and proved the Fishery Board's ignorance of her law and methods. It must be remembered that these gentlemen have obtained all the money and all their powers on the assurance that if granted, so far as legislation on size of mesh was concerned, a very large proportion of the fish permitted to escape would grow to maturity, and the fishermen would again take them and reap a rich reward for their enforced moderation.

The fish which these gentlemen selected as the type of round fish, as shown in their bottles, is the whiting, and they are perfectly correct in this, for undoubtedly of all round fish, more small whiting are caught by the trawl nets than any other valuable species. It therefore follows that of round fish this species should have prospered beyond all others, and after years of waiting the fishery should now be established on a rich and substantial basis. Nature has replied to that argument in her own way. Had there been a small increase in the large whiting

fishing our scientists would have rejoiced exceedingly. Had there been a small decrease they would have argued that if their advice had not been followed things would have been worse ; but what is the actual state of things? Natural causes, as far, apparently, beyond our ken as infinite intelligence itself, have quietly removed from the Irish Sea fishing grounds, worked by the Lancashire boats from Fleetwood, the myriads of adult whiting which occupied them when these meddlers with what they do not understand took the fish of the sea under their patronage. At that time the average catch of each Fleetwood boat was reckoned in tons per week. To-day and for two or three years back only an odd box now and then, just enough to add to our mystification by showing that the conditions of the sea are such that whiting can live there. Commercially the whiting fishery is for the present, and for some time has been, absolutely extinct. Where are those countless myriads of whiting gone? Not only has Nature removed them from the grounds, but she has quietly substituted in equal numbers another fish, the haddock, whose early life history is more obscure than that of the whiting, and as if in derision of the claims of the scientists, a fish that even they cannot pretend to be influenced in any way by what man has done.

The fishermen demand that Professor Herdman and Mr. Dawson shall account to them for the fruits of their

toil of which they have been so ruthlessly deprived. Where are the fish taken from us? You cannot argue about mysterious laws of Nature. You undertook that if these fish were released, they should be returned as a far richer harvest. Where are they?

But another very serious question arises to which an answer must be given. In the Fishery Exhibition we have before us now (in May, 1899) these young whiting are shown as a proof of the wisdom of these gentlemen's proceedings. Are they so immersed in the vast importance of the question as to how many legs or other appendages a shrimp has, or the exact percentage of grains of sand that a cockle swallows, that they have not noticed this stupendous phenomenon so destructive to all their theories. It has existed for several years. Surely they are not deliberately trusting to the want of knowledge of fishery questions in an inland town, and trading on it; and yet I do not see how we can avoid one of these two conclusions. If they do not know they are condemned. If they do know, have they brought the matter before the Sea Fisheries Committee and put them fully in possession of this information.

Had nature chosen to act the other way, and had their meddling coincided with a great increase of whiting instead of haddock, what a noise would have been made throughout the world. Knighthoods or peerages would

have been too little honour for such demi-gods. But Providence has timed it otherwise. Did we choose to claim that first appearance demonstrated facts, we might certainly assert that these fishery laws had destroyed the whiting. We do not, however, act on their lines. We recognise old Dame Nature's hand, and simply claim that so far as the fisheries are concerned, all this cost and all this cruelty have no effect on the supply of fish, good or bad.

Apart from this phenomenon connected with the whiting, experiments at Southport showed clearly that a year was sufficient to make most fish sizable; that in the four chief groups three years would grow fish to an enormous size; shell fish as far as we have any data come under the same conditions, therefore in return for the heavy cost, and the vastly more serious moral injury inflicted on our shore fishing population, we are entitled to ask at the end of eight years for some proof of the value of their work.

We were told the fishermen would soon recognise the fishery officials as their best friends. Do they? What are the results? Fishermen discontented, bitterly complaining, risking fine and imprisonment rather than obey the law, the scientists complaining that their boats have no time for scientific work as the 13 bailiffs are so heavily employed doing police work. More men are wanted, more areas

closed, greater powers—they even aspire to close the whole Irish Sea—and more money, to be as I think I have shown, hopelessly squandered.

What can you expect, however, when the affairs are directed by a gentleman who after some years' experience can deliberately and seriously put such a proposal as this forward:—

3rd. "When the time comes, as it probably will, when it will be cheaper and surer to farm fish than to hunt them, when fish are bred, reared, and fed up for market, then fish food will have to be accurately ascertained and carefully cultivated, and all such statistics as those we are now accumulating will be of value, and receive their proper application."

Certainly the wildest scheme which ever was floated on the Stock Exchange is the soberest common sense compared with such a proposal, as any one will see who will make a few calculations, and yet the lives and destinies of our fishers and their families are practically at the mercy of this scientific dreamer. And this is only one instance. There are plenty of equally absurd proposals in the Sea Fishery reports.

Again, forty or fifty years since there was a most important herring fishery in Morecambe Bay. I well remember the time more than 200 boats fished regularly every night during the season right in the bay, almost close up to the Wyre light. So important was it that there was

a regular boat-building industry. Vessels were built specially for it. But more than thirty years since the herring deserted the bay. Why, no one knows. Old fishermen say the artillery practice at Fleetwood and Morecambe was the cause. Certainly herring and mackerel are very timid fish. I have been out in Morecambe Bay, off King's Scarr, lying at anchor with a large shoal of mackerel playing on the surface and almost close to the boat. At the boom of a gun fired from Fleetwood they all instantly disappeared, and I saw no more of them. I hardly think, however, that if food was plentiful the herrings would desert, though firing late in the evening would probably make them very timid and spoil the night's fishing. I fancy it is a question of food. The herrings have not absolutely deserted the bay. A few are caught in stake nets every year on Pilling Sands, and their fry, in the shape of "whitebait," exists in large numbers. Before the bye-laws were passed, I often made test drawings along the coast, with specially-constructed nets, to ascertain the state of things. These nets could never have been used commercially. No fisherman would have helped me and taken part of the catch as his share of the day's work. They could do no possible harm, and they yielded valuable results, but to prevent anything being known by the public except through such information as they edited and often misinterpreted, these drawings were

made illegal unless used by a fishery official. With these nets I often got fine catches of whitebait, and it was with whitebait caught in Morecambe Bay that we solved at Southport the problem as to whether whitebait were the young of the herring, by the simple and conclusive process of growing them into fine herrings. This was accomplished in two years, thus giving the rate of growth of another of our great food fishes.

Personally I should not be surprised if the herring returned to Morecambe Bay. They have deserted other places for many years, sometimes half a century, and then returned, and unless the artillery question has something to do with it, I see no reason why they should not return again.

About sixteen years since, I believe, they made an approach. I was dredging well out in the bay with an old boatman (Fairclough), when we found the sea birds in countless thousands, such a sight as I have never seen before, or since; hundreds of Gannets, and countless thousands of Razor Bills, and Guillemots, beside myriads of Gulls. The birds were so tame that I could have struck them with the oars, all signs pointing to herring. This continued two days. We reported it to the boatmen, and some of them who had some old herring nets, went at night, and tried, and caught a few, but not enough to pay, and apparently the shoal thought better of it, and went elsewhere.

Since the Fishery Board came into office, a severe calamity befel the cockle beds, for vast quantities were killed during the terrible frosts a few years since. The cockle beds, however, owing to the operation of two of the great laws, namely, vast fecundity, and the capacity of overcrowded specimens to develop their full growth, speedily recovered by natural means alone, without stopping the cockling. This is a phenomenon which we can understand, but our knowledge is only moved a step back. We do not know why this specially severe frost came or why it worked so much destruction. Such a cause would not affect the haddock, as down in the sea the frost has little or no effect; neither is it probable that any great calamity befel the fish, for they gradually died away, and after the lapse of years as gradually returned. My own view is that Frank Buckland's theory was the correct one, that it is all a question of food, but this again only carries us one step back as long as we know nothing of the cause why special food should be plentiful for years, then cease, and again become plentiful.

Since Mr. Buckland expressed this opinion, a case has occurred under our own eyes which confirms it. During my early days it was a very favourite amusement to go fishing in the channel at Fleetwood, and very good sport it was. For a great part of the year we could always rely upon a good catch of codling up to two pounds weight,

and fluke. In addition to this, there were always several boats trawling and getting nice catches. The Fleetwood Channel is a small area, about two miles long from the Kanch Buoy to the Wyre light, and at low water, when alone the trawling takes place, not more than a quarter to half a mile wide. By-and-bye the fishing fell off, and in the latter seventies there was scarcely a fish to be caught. Over-trawling, of course, was the alleged cause, and if ever such a complaint could be justified it appeared probable in this case, as the area trawled was so small, though it had free communication with the sea. Coupled, however, with the disappearance of the fish was the partial exhaustion of the mussel beds, and even the ross formed by the annelids was greatly reduced, made little growth, and looked generally worn and shabby. In 1880, however, I was rambling about the shore when I saw the whole place, every blade of sea-weed, every stone or bit of stick from high to low water covered with minute specks. A lens showed at once that they were very little mussels. I took a handful of sea-weed home, poured some boiling water on it, and so plentiful were the mussels, the size of a very small pin's head, that I got half a teacup full of them. I sent some to Mr. Buckland, who recorded this, the most extraordinary fall of spat I have any experience of, in *Land and Water*. I also showed them with a lens to the local fishermen, telling them I believed next year the

fish would come back. The year following I went to Fleetwood to investigate. The first sight that caught my eye was no less than fourteen boats trawling in the channel. The fishermen said they had never known such an abundance of fish. I cannot, however, do better than copy the report I sent at the time to Mr. Buckland, which appeared in *Land and Water*.

“Last year I called your attention to the enormous deposit of mussel spat at Fleetwood, and, in fact, everywhere that I have visited. I have just returned from a rather long visit to Fleetwood, and I have brought with me some of the young mussels of last year, a few of which I enclose you. You will note that, like most forms of aquatic life, their progress during the twelve months has varied very much indeed. Some of the banks are far more advanced than others. I have made a careful examination of the beds, and much as the prodigious fall last year surprised me, I am still more astonished at the sight presented now. Every inch of ground to which a mussel could anchor itself, even almost to high-water mark, has been taken possession of. Scores of acres of gravel beds, which, with thirty years' experience of the coast, I have never known as mussel beds, are now densely crowded with them. They have completely altered the nature of the shore, and over vast tracts where it used to be pleasant to walk and watch the living inhabitants of the sea in the tide pools, there is now a thick crust of mussels, with a substratum some inches thick of soft mud, into which one sinks ankle deep. It is an interesting

question what the mussels will do; at present there are at least ten where one full-grown one can live. In some places where the tide has great power, it has (assisted by trawling vessels) worked through the mud under the mass of mussels, and lifted them bodily away; this only appears to distribute them more evenly. Nature, however, is hard at work setting matters right. In the first place, as I predicted last year, enormous quantities of fish have made their appearance, so much so that although the channel is only about two miles long by a quarter-of-a-mile wide at low water, there are always several trawl boats (on one day there were 15) at work, in addition to many boats fishing with lines, and yet there is no diminution of the supply. The fish are being largely assisted by other creatures; starfishes are especially plentiful. Another singular phenomenon attracted my attention. For a number of years past the nars, or ross, the curious sort of sand coral, built and inhabited by countless millions of annelids, has been in a very dilapidated state, ragged looking, and very rotten, as if the worms had seen their best days, and were rapidly going down hill; now simultaneously with the great mussel fall, these nars have taken a fresh start, the old rugged lumps are covered with a new regular growth, and the rotten parts have become consolidated and firm to the tread; not only this, but new ones are springing up between the mussels over vast tracts which have never previously borne them. As a proof of the great vitality at present existing, I secured two young whelks,—*B. undatum*,—evidently last year's brood, each of which carried on its back a lump about

four inches high of living ross. I was much surprised to see it, as I was not aware that the building operation was so rapid that the foundation could be laid on a moving object, and a building so high erected so quickly. The large crass anemones are also very much more numerous. In fact the whole shore has awakened in a most surprising manner. Why it should be so, what the connection is between mussels and annelids, I cannot make out; the fish are accounted for by the abundant supply of food. I presume the mussels and worms are accounted for by the same conditions suiting both; but what are these? "Heat and tranquillity," so good for oysters, won't do here, for last year there was neither. Again, the mussels are thickest and largest where the rush of tide is strongest. This year, though so very much warmer and calmer, does not appear to have yielded any fall of mussel spat worth naming."

The year following I went again, and found the same state of things, but Dame Nature discovered that even all her ordinary destructive forces were not sufficient to keep the mussels in check. They had accumulated to a foot and a half to two feet thick in some places, so she called the tides to work, lifted them bodily, hundreds and thousands of tons, and threw them into the channel, washing them away to sea. This was the time referred to by some of the witnesses at the Preston enquiry, when they said eighteen or twenty boats from Morecambe, in addition to the Fleetwood boats, were gathering mussels, and gathering them so

small that they only fetched a shilling to eighteen pence per sack, and there was nothing for the fishermen. As far as this is concerned, the evidence falls by its own weight. All those boats with four men each would not have come from Morecambe tide after tide, and done the fearfully hard work connected with musseling, unless it had paid them well on the average, and if it did pay them, it was certainly no harm, but probably a distinct gain, for if more had been taken the many acres of ground left bare by the tide might have retained their stock. The work is too hard, and the economical conditions too strict to allow men wantonly and for pure destructiveness to take mussels, and when they are so plentiful that they can be got so as to sell them cheap and yet pay it is a distinct advantage to the community. There has been no such fall of spat since, though there has apparently been no scarcity, and the fishing has never fallen on the evil times of the latter seventies.

Now, if trawling could trawl out a space open to the ocean, surely it should have done so in the narrow channel of Fleetwood, for so many boats must have taken a very large proportion of the fish out each time, but as man took them Nature supplied them from her reserves, over and over again, and will do so as long as there is the attraction of food, whatever man can do.

One thing might be done for mussel culture, though not on the natural beds. There are large areas in the estuary

of the Wyre so suitable for mussel fattening that if they could only be leased and secured to the fishermen, they would bring in a large revenue. Many years ago, when Mr. John Bright was Chancellor of the Duchy of Lancaster, I brought this question before him, and he entered into it, but unfortunately he resigned office, and as I had no influence with his successor, the matter fell through, but surely our County Council might do something.

Mr. Dawson now suggests the same idea, but his plan is to make the fishermen dependent even for this privilege on himself and his colleagues. Why cannot the Duchy of Lancaster lease the foreshore for this purpose direct to the fishermen? Better in my opinion even be without the privilege than put the fishermen still further under this authority. I have named several times the cruel and inconsiderate way in which the bye-laws are enforced. I give a sample, too bad to allow the magistrates to convict, copied from the local papers.

The report in the *Ulverston News* of April 8th, 1899, is as follows:—

Before Mr. E. Wadham (chairman), Mr. B. B. Gardner, and Mr. W. R. Nash.

REMOVING UNDERSIZED MUSSELS AT ALDINGHAM:
A VICTORY FOR THE FISHERMEN.—James Porter, Robert Porter, John Shaw, and Edward Martin were charged at the instance of the Lancashire Sea Fishery Board with removing from a certain fishery on the 20th

ultimo, a quantity of mussels less than two and a-quarter inches in length. Mr. Sanderson, of Lancaster, appeared to prosecute, and Mr. Poole defended. John Wright, head fishery bailiff, stated that on the date named he was on duty at Moat Point, near Aldingham Church, when he saw the defendants returning from the mussel bed at Roosebeck in their boats. When the Porters saw him they emptied six bags of mussels into their boat. On taking a sample he found that out of sixty-seven only ten were of the proper size.—Cross-examined: The mussels were got in deep water with rakes, and as they were brought up in lumps they had to be dressed. To my knowledge it is not the custom to bring the mussels to the mooring place, dress them there, and take the small ones back the next day. I never told Shaw or any other fisherman that he was all right so long as he did this.—Wm. Thompson, another bailiff, stated that of the sample of Shaw's and Martin's mussels, which he examined, seventy-four were small and nineteen large. Defendant had over two hours in which to sort them when coming up in the boat, and he considered the weather fit for the purpose.—John Hargraves, a third bailiff, confirmed this. In cross-examination he positively denied that in the presence of the defendants he had told them they were all right so long as they dressed their mussels at the landing stage and carried the small ones back next day. What he told Bailey was that they would have some small ones to take back.—Mr. Poole, in his address to the Bench, said he had never heard a witness give his evidence in such an unsatisfactory manner as Hargraves, who had quibbled

and shuffled and lied in a most extraordinary way.—
 Mr. Thompson: No, no.—Mr. Poole repeated the statement, and added that there were scientific liars as well as other liars. He contended that there was nothing in the evidence to show that the mussels had been permanently removed from their natural bed, or that they had been appropriated for the purposes of sale. He called Samuel Bailey, fisherman, Thomas Shaw, fisherman, and the four defendants, all of whom swore that it was impossible to dress the mussels at sea, and that the bailiffs had seen them being dressed at the mooring without raising an objection.—In such rough weather it was impossible to dress them at sea.—Bailey added that the witness, Hargraves, had on one occasion stated in the presence of Martin and Shaw at the mooring that if the mussels were dressed there, and made marketable, and the small ones taken back, it would be all right. Sometimes the mussels were loose in the boat, and at other times they were put in bags and used as ballast.—The Chairman: And did the officers ever interfere with you for doing this?—No, never.—Mr. Sanderson said the question was whether the mussels had been removed from the fishery within the meaning of the bye-law, and he called attention to the judgment in the Appeal Court of Justice Wills in the cockling case of Thompson v. Burns.—The Chairman: We have carefully considered this case, and from the evidence before us we don't consider any breach of the bye-laws has taken place. The cases, therefore, will be dismissed.

Now, sir, can we conceive anything much worse? The well-fed "Bumbles" of the Sea Fishery Committee, waiting comfortably on shore, know that fishermen's wives and children have a bad habit of getting hungry even in stormy weather, and that husbands and fathers must risk their lives in wind and storm to feed them, see their opportunity of getting "cases," and seize it. I won't say more. The report is enough.

Finally, sir, let us enquire what the deep sea trawling fishery of the Irish Sea is, for all this cost and cruelty is avowedly in order that more large fish may be caught there. The position of the Irish Sea is precisely the same as a large farm. Enormous quantities of seed can be planted and grown to a certain age and size, but the amount of fish or full-grown plants, say, for example, cabbages, is regulated by the size and fertility of the fields. We find while the seed beds are enormous along the coasts, the fields are comparatively small.

The law of retardation of growth, which I have explained before, seems to apply in this limited sea, and I think also the feeding grounds are not rich pasture. The beds can in no possible sense compare with the grounds out in the open sea. In its palmiest days, 30, 40, 50 years ago, the fishery was more important than it is to-day, but not *per se* simply because of the economic conditions that prevailed, just as in those days our English copper and tin mines, or wheat

fields, &c., were of value; population was much smaller, means of transport were much inferior, demand for sea fish was less, the great ocean fishing grounds were many of them undiscovered, and, above all, steam trawling was unknown on a commercial scale, and no means existed of preserving fish for more than a few days, consequently at this time it paid to fish the small Irish Sea beds for all they were worth. Yet even at this time the fishing fleet from Fleetwood, by far the most important of all on the Irish Sea, never numbered more than 150 small boats carrying four or five men and a lad. To-day there are only 44, and during the life of the Sea Fisheries Committee, instead of a great revival, there is a steady decrease, for in 1890 there were 66, and had it not been for the beneficent action of Dame Nature referred to previously, in bringing such shoals of haddock off our coast, probably there would not have been a dozen, as the catch of haddock, reaching as it does to a ton and more per day per boat, is the source of profit, and this is the industry supposed to be protected at such cost of money and individual suffering. Yet there is a great increase in the amount of fish landed at Fleetwood. Why this contradiction? Something has taken place totally independent of the Sea Fishery Committee; though very lightly alluded to by the scientists, it is of vast importance to our subject. Fleetwood has been thought by some of the Great Grimsby firms to be a convenient port for landing their fish, and a fleet of 50 or

60 large steam trawlers, 100 to 160 tons burden, fishing with nets 90 feet wide and more on the otter trawl system, as compared with the 30 to 50 feet nets on the old beam trawl principle, independent of weather and tides, fishing with double sets of gear, one set always down while the fish caught by the other are being sorted and the nets cleared, carrying crews of eight to 18 men, and steam power for hauling nets and doing all the hardest work, have found it paid to land their fish at Fleetwood for certain markets. One firm alone, to give an idea of the size of the fishing industry, had no less than 37 of these boats landing their fish there. But these boats are not fishing on the grounds protected (?) by Professor Herdman. They are equipped to go further afield and reap the rich harvest of the deep sea beds. They fish off Iceland, off the Hebrides, anywhere; a thousand miles is no object to these grand productions of modern practical science. Again, the boats fishing for mackerel and herring off the Scotch coast now land a great deal of their fish at Fleetwood, and these great fisheries are so much more profitable that more and more capital is finding its way into them. We might, of course, expect that only 44 boats fishing where 120 to 150 fished years ago, the individual boats would get more fish, as they would be able to pick out the best bits of ground for themselves, and such is the case, though if it were not for the haddock even this would not be so; but that it will not pay to increase their numbers is evident, or they

would increase instead of decreasing. So small compared with the great whole is the amount they catch that it has almost no effect on the trade.

We find on investigation that even the towns of Lancashire itself do not rely upon this supply, but draw from Grimsby and Hull the products of the open deep-sea fisheries, and not only the inland towns but Liverpool, Southport, Lytham, Blackpool, Morecambe, Ulverston, and more wonderful still, Fleetwood itself. The principal fish-shop in Fleetwood is owned by the principal owner of the Fleetwood smacks, and yet his own shop receives its daily supply of fish from Grimsby, as the Irish sea fishery is too small and unreliable to maintain a supply for a steady demand.

What about the great towns of Ireland, more especially the coast towns, Dublin and Belfast, for instance? These towns also draw their supplies from Grimsby. Every day, about noon, two heavily loaded trains leave Grimsby to catch the Fleetwood and Holyhead steamers, so as to have their fish in Belfast and Dublin by next morning. The large Grimsby fish merchants are personal friends of mine, and have themselves given me the statistics. This condition of things has come to stay. Professor Herdman and Mr. Dawson can do nothing to stop these wealthy companies. They are not poor, helpless fishermen whom they can prosecute *ad lib*; nay, more, it will increase. At present very few fishing grounds are known compared with

the probable total, and we are certain that the limit in power and capacity of steam trawlers has not been reached. They are built larger and more effective each year. Those built ten years ago are almost obsolete, and I venture to say those of to-day in another generation will be looked upon as antiquated.

What then is to be done with our Irish Sea fisheries if, like our wheat fields, they can no longer be useful to supply the main wants of the population? They must supply the minor luxuries, shrimps, cockles, and comparatively small fish for those who love a tasty morsel. Already these fisheries exceed in volume many times the deep-sea fisheries, and employ many times the number of men. If protection was possible, it is the shrimp industry that should have it, and judging by the bottles shown by the Fishery Committee as the food of fishes, it needs it very badly, for the larger forms evidently consume an amount of shrimps utterly out of proportion to their own value, and we might take up a crusade against predaceous fishes in all stages, little as well as big, with far more justice than closing grounds and limiting the work of our inshore men, until actually Southport, which used to be called Shrimpopolis, is drawing supplies of shrimps from Holland, when there are plenty at our own doors if the shrimpers are allowed to take them. The Lancashire Coast and Irish Sea Fisheries are precisely in the position of

agricultural land near large towns, almost useless for growing wheat, it has great value for growing vegetables, supplying eggs, poultry, milk, &c., and our coast fisheries must supply shrimps, cockles, mussels, smaller fish, &c., for which there is always a large demand, and a large and valuable element in our population must be encouraged to find better means of fishing, not worried and harassed by utterly senseless prosecutions.

It has always appeared to me extraordinary that when the Lancashire County Council got their powers they utterly ignored all that had been done before, and refusing to commence with such light as there was and work on from that, they commenced *de novo* groping in absolute darkness. Probably the members of the County Council were not told by their scientific advisers what had been done, though there were many sources of information to start from. I refer especially to the Government enquiries all round our coasts by Messrs. Buckland and Walpole, now Sir Spencer Walpole, K.C.B. In passing, let me pay a tribute to my old friend, Frank Buckland. It is the fashion among many of our modern scientists to sneer at Buckland as a naturalist because his ways were not their ways. He was educated before the modern schools of biology assigned to themselves such vast importance and lost the study of Nature in microscopic investigation. As the eminent Japanese zoologist, Professor Mitsukuri, mournfully

exclaims: "Nowadays it is very rare to read of the pleasures of a naturalist. Zoology and botany have become too serious a business to leave much margin for pleasure." But if we understand by naturalist a keen observer of Nature, a passionate lover of her ways and works, a man with a capacity for interesting others in her study and inducing them to do their best work and give the world the benefit of their knowledge, Frank Buckland has no living representative, and unless we except Gilbert White, of Selborne, we look in vain for his equal in his own line. His name will stand out for the work he did with his free, open, generous nature when many of the pitiful scramblers to be the first to announce to an astonished world some trifling discovery which they have made are forgotten. He was utterly incapable of launching forth as facts ill-considered guesses at the operations of Nature. Imagine what he would have said to the idea of closing a whole county's seaboard to scientific investigation.

I think no one who knows anything of the subject, can compare for a moment the two enquiries, in regard either to the scope of the enquiry, the value of the evidence, the analysis of the evidence, or the final judgment. Every scrap of real evidence since obtained, and the utter failure to obtain any good result by adopting a course in opposition to the finding of this court, has proved the correctness of their judgment. Their decision is rendered more impressive

by the fact that the Commissioners entered upon their task, if anything, prejudiced in favour of repressive legislation, and impressed by the idea that an enormous destruction of small fish was taking place, and that our fisheries were being ruined.

Before 1878 we find Mr. Buckland writing in season and out of season, in his own impetuous way, denouncing the fearful destruction of small fish, even introducing the question into his Salmon Fishery reports to Parliament, so eager was he for something to be done.

In 1878, however, Government, impressed with the continual outcry, appointed two commissioners. Buckland was one, but with him they coupled Mr. Walpole, perhaps the very best selection they could have made, for, while a naturalist himself, Mr. Walpole was as cool and logical as Buckland was hasty and impetuous. He brought to the enquiry the mind of a trained barrister, educated specially to sift evidence, and to endeavour to extract the truth out of masses of conflicting statements.

I will not weary you with all the contradictory evidence, it is all published in the Blue Book, but will confine myself to quoting their conclusions arrived at after, as I have said, an enquiry not confined to the Lancashire coast but extending all round the British Isles.

“ The sea cannot support more than a certain proportion of the fish that are born, and there is no harm,

therefore, in utilising the remainder as food. The same argument might be urged against the eating of eggs or the eating of lambs, and the same reply might be given. But the world has long since made up its mind to go on eating eggs and lamb, and the reasons which justify it in doing so justify it still more in eating fish fry.

“There is one argument urged against this view, which, however, requires consideration. If, it is asked, it be unnecessary to preserve the fry of sea fish, why is it necessary to preserve the fry of salmon? The answer to the question may, we believe, be found in the distinctive habits of salmon and sea fish. Salmon are fish which migrate to and from river and sea. Sea fish are fish which live in the ocean. It is obviously possible for man to place some obstruction across a narrow channel in order to stop all or nearly all the salmon in their migration. But it is impossible by any device to surround or capture all the fish in the ocean. Salmon can be intercepted like the traffic which passes along a street. Sea fish can no more be intercepted than the traffic which crosses a plain. There is nothing easier than to place a turnpike gate across a road and to force all vehicles passing along it to pay toll. But a turnpike gate on a broad plain would be of no use. Nearly every carriage would pass it on one side or the other.

“This example seems to us exactly to illustrate the distinction between a fish like a salmon frequenting a narrow channel during one portion of the year and sea fish which pass the whole of their life in the sea. Whenever the habits of any fish compel it to live throughout the year in a confined area to which man has access, or to pass once or more in any year into

some narrow space commanded, or being capable of being commanded, by man, laws seem necessary for its preservation. When, on the contrary, the fish live in the open sea, we believe that no such laws are necessary.

“It may, however, be thought that all sea fish, or most sea fish, do come within the rules which have thus been laid down, since all sea fish, during the earlier stages of their development, draw in either to estuaries, or to the shallow waters which fringe the shore. But, speaking generally, there is no reason to suppose that the operations of man are making any sensible impression on the numbers of the fry even in these places, since there is no evidence that the stock of fish in the sea generally is decreasing.

“Complaints of a decrease of plaice and flounders were made to us at Furness, Ulverston, and on the north side of Morecambe Bay, and the decrease was almost universally attributed to the shrimpers, or to the neglect of the shrimpers to throw over the young flat fish at sea. It appeared, however, in the course of our inquiry that in the neighbouring estuary of the Duddon, where there was no shrimping, the decrease of flat fish was equally marked. It is fair to assume that the same cause is affecting both places, and as the decrease in Duddon estuary cannot be attributed to the shrimpers, it seems unfair to lay the blame of an exactly similar decrease in Morecambe Bay on the shrimpers.”

And on further considering even the question of prohibiting the sale of small fish their judgment was as follows—

“Small immature fish are the food of the poor. Weight for weight, immature fish are cheaper than mature fish, and, therefore, unless the clearest grounds for prohibiting it can be explained, their sale ought not, in our judgment, to be prohibited. The evidence on which we have formed the conclusions at which we have already arrived in this report satisfies us that these grounds have not, as yet, been proved to exist. There are no reasons for thinking that the supply of fish, taken as a whole, is decreasing; there are no reasons for thinking that the destruction of immature fish which is undoubtedly going on is wasteful in the sense that it is diminishing the future supply of mature fish, and it is not proved, even in those isolated instances in which a decrease of fish may be traced, that the decrease is due to over-fishing. Those who have read Mr. Lecky’s interesting history of the 18th century will probably remember that more than 100 years ago the Irish attributed the decreased supply of pilchards on their coasts to the new system of trailing (query trawling) which had then been lately introduced. At a still earlier period, Bishop Wilson, the eminent prelate of Sodor and Man, ordered a general prayer to be offered up in the Litany, ‘That it may please Thee to give and preserve to our use the kindly fruits of the earth, and to restore and continue the blessings of the sea, so that in due time we may enjoy them.’ This beautiful prayer, which is still read every Sunday in the churches of the Isle of Man, is a clear proof that Bishop Wilson thought that the fishery needed restoring. More than forty years ago, Jeffrey, staying in Renfrewshire for the summer, noticed that there were no herrings in the

Firth of Clyde. About the same time, a trawler fishing from Scarborough, laid three soles on the pier at that place with the observation that they were 'the last three in the sea;' while in 1837 a petition presented to Parliament declared that the fishermen of Scotland, Ireland, and Holland had found out the breeding-places of the herrings, and had resorted there to catch them, and that since the discovery was made the fishery generally throughout the West and North of Scotland had annually decreased. It is an instructive commentary on the petition that the yield of the Scotch herring fishery was actually increasing at the time at which it was presented, and that the yield is now more than double what it was then. In the same way the people who now complain of the want of fish in the Irish Sea forget that similar complaints were made by their ancestors more than a century ago. The people who ascribe the recent failure of the herring fishery in the Firth of Clyde to the introduction of circle trawling forget that Jeffrey had noticed the failure before circle trawling was introduced. There is always, in fact, a temptation to ascribe any failure in the yield of any particular fishery to some interference on the part of man. There is always a temptation to overlook the fact that the same failures periodically occurred when the operations of man, slight as we believe them to be, were much more imperceptible than they are now, and to ignore the consequent inference that failures have occurred in the past, and may, therefore, occur again in the future, from causes which man has been, and probably still is, unable to control."

A few years later, in the literature of the Sea Fisheries Exhibition, we find Sir Spencer Walpole declaring in reply to a statement that fishermen decimated the shoals of fish approaching the shore to spawn:—

“Even assuming it were possible, I doubt whether any harm would result. No one would think a farmer improvident who brought one-tenth of his herd annually to market. A fish reaches maturity much more rapidly than an ox, and is some thousands of times more productive than a cow. Why, then, should it be improvident for a fisherman to do what no one would think a farmer improvident for doing? In short, though I doubt the possibility of decimating a shoal of fish, I should regard such a course, if it were practicable, as about the best use the fisherman could make of it.”

And further—

“While I am opposed on the one hand to the imposition of unnecessary restrictions on fishermen, so I am opposed on the other to all patronage simply as such, because I believe the best part of the British fishermen is the independence which they enjoy; and God forbid the independence which they have won by their own efforts should be taken away from them by the patronage of other people.”

The same authority pointed out that the prohibition of trawling in the loughs and bays of Ireland had not resulted in an increase of the Irish fisheries.

It is a relief, after reading the reports of the Lancashire Sea Fisheries Board, the assurance of superior wisdom, the

assumption of almost infinite ignorance on the part of practical fishermen, and the impertinent, patronising account of how he teaches them their business of Professor Herdman, and the sickening account of the progress made in turning our free, independent fishing population into criminals of Mr. Dawson's reports to turn to this summing up of the case by Sir Spencer Walpole, a man who knows the men well, has won their confidence and esteem, and has taken the trouble to study the fishermen, their interests and characteristics, as well as the contents of the stomachs of cockles.

It is a curious thing, but so completely has Mr. Walpole's identity been obscured by his long and successful government of the Isle of Man, and since then his skilful conduct as General Secretary of the Post Office, that he is constantly referred to as "the late Mr. Walpole." Professor McIntosh himself falls into this error. He is, however, still very much alive, and will, I hope, enjoy for many years the well-deserved honours conferred upon him by his sovereign.

Sir Spencer Walpole, K.C.B., does not think it would be a good precedent for him, as a retired public official, to re-enter the arena of fishery politics, but he permits me to say that nothing has transpired since he and Mr. Buckland held their exhaustive enquiry round our coasts to alter in any way the opinion which he then formed.

Again, Dr. Day, C.I.E., who even our scientists quote as an authority, was on his return from India imbued with the same idea as they are. On his own account and at his own expense he made a careful enquiry round our coasts while preparing the material for his splendid work on British Fishes. The result was that he was convinced that no restrictions whatever could profitably be placed on our fishermen.

Sir Thomas Brady, lately one of the inspectors of Irish Fisheries, is strongly impressed with the same views.

Professor McIntosh, on the Scotch coast, in his splendid, exhaustive, and convincing work just published, "The Resources of the Sea," takes the same view.

Mr. Dunn, the great Cornish authority on fisheries, largely interested in them pecuniarily, to whom their success is of vital importance, is pressing the same views on the authorities.

Many others could be named. Authority after authority, disgusted by the futility and cruelty of the legislation of the past 15 years, which finds its extreme on the Lancashire coast, and its wastefulness from an economical point of view, are coming round to the views so ably expressed by Mr. Walpole 16 years since, and so verified by the results of a policy opposed to his advice. The advisers of the Lancashire County Council seem to be almost the only

people now left who do not or will not see light in the darkness.

Something, however, in Mr. Dawson's report seems more serious than all that I have so far said. It is the very first principle of law-making that the law shall be workable, and that it shall be effectually enforced. If not, whatever it may be it is useless and demoralising. But as we read Mr. Dawson's reports we find the most pitiful complaints that with all the costly staff and means at his disposal he cannot efficiently "protect the fisheries." He needs more steamers, more boats, more bailiffs to patrol the waters in fair weather, and more to lurk on shore in stormy weather to entrap the unwary and storm-tossed men who have brought a few undersized mussels into quiet water. He says with such an inefficient staff he can only pay "surprise visits." This means that if these Bye-Laws are to be effectually enforced, and there is no middle course, we must provide Messrs. Herdman and Dawson with a fleet of steamers and other vessels, and a small army of bailiffs; we must pay tens of thousands where we now pay thousands of pounds, and must be prepared to see hundreds of fishermen prosecuted where we now see scores, until all spirit, independence, and life is dragooned out of them, and they are kept down by a literal reign of terror. But further, if this is right on the Lancashire coast, it is right all round England. The cost will amount to hundreds of thousands

of pounds in money ; but in the entire demoralisation of our fishermen, who shall count the cost ?

England has relied more than once on the free, independent spirit of these men, and dare she for the sake of a few small fish stamp this spirit out ? If it was proved that these laws did far more good than even their wildest advocates surmise they may do, would it be worth it ? In my opinion our fisheries themselves are hardly worth it. But when the best evidence and the best opinions go to show that it is absolutely useless, are we in Lancashire prepared to give these men carte-blanche, and then to pay the bill ? Are we prepared to take the responsibility of leading in this, as I think, thoroughly bad cause ?

You will perhaps say, then, do you propose to do nothing ? Certainly not. I should be a poor naturalist if I proposed we should rest satisfied with our present knowledge. Let the County Council, if they will, endow original research, but avowedly as such. Let us have as much interesting information as we can get about the denizens of the sea, &c. Nay, further, if by any chance any worker appears to be doing any honest work of commercial value, even if it is the biologists of University College (if such a thing is possible), let us assist them for all it is worth. We are a rich county, and can afford the capital for anything that is worth it, but all this can be done at a small cost compared with what is spent at present.

In regard to the work being done at present, what does it amount to, speaking commercially, and as a return for the great expenditure? Some monographs of semi-microscopic crustaceans, telling the number of their limbs, and giving pretty woodcuts of them; interesting accounts of how a great steamer set little bottles afloat in the various cross-currents of the Irish Sea, &c.; all which may be interesting in its way, and is valuable for our purpose, as it demonstrates their absolute ignorance of the very first elements of their problem, but commercially is playing with the merest outskirts of their subject. I fail to see the commercial use of repeating *ad nauseum* the examination of the stomachs of fish, and carefully noting the exact percentage of each kind of food found in them, unless for some special purpose.

The general food of sea fishes was sufficiently well known for all practical, as distinguished from purely scientific, purposes, five-and-twenty years since. Judging from the bottles in the Fishery Exhibition, I should say a great deal has been forgotten since then. But what does it amount to? Fish, like *Homo sapiens*, have a wide range of diet, and each individual fish, like each man, gets his living by minding his own business and finding the best pasture he can. The diet of man is fairly understood, but suppose Mr. Dawson let down his net and took a dozen aldermen returning from a Lord Mayor's feast, and then took a drag through a workhouse and captured a dozen paupers. He

would hand these over to Professor Herdman. The worthy professor would examine their gizzards, and we should, to be on all fours with the fishery reports, have a learned explanation as to the percentage of turtle soup and venison fat in one series of subjects, and the brown bread and oat-meal in the other, and some very sagacious remarks as to the evident superiority of the one diet to the other, gauged by the condition of the subjects, but *cui bono*, neither Professor Herdman nor all the County Council can arrange such a trifling matter as that paupers shall have the fare of Aldermen. Infinitely less can they do to provide fish in the sea in poor circumstances with diet to them "aldermanic."

When we come to analyse commercially the practical work done by this costly institution, whether we take the pretty but pitifully meagre, as far as any progress is concerned, exhibition which is being hawked from town to town, or the reports presented to the Committee, or the result of ten years' police persecution of the fishermen, and compare it with the heavy yearly bill and the vast means employed—the whole biological staff of University College, a highly-salaried Superintendent of Sea Fisheries, a small army of thirteen water bailiffs, a powerful, well-found steamer, sundry other boats, nets, and scientific apparatus galore ; a station at Port Erin, and another at Peel—it gives us one distinction. There is an old story of two little girls disputing about the grandeur of their ancestral

mansions. One for a minute or two eclipsed the other by announcing that their house had a verandah on it, but was completely annihilated when her opponent retorted "that was nothing, their house had a mortgage on it." If any inhabitant of some other county should crow over us, and announce that they have got the sea serpent on their coast, we Lancashire people can always proudly retort that we possess the mountain in labour that brought forth a mouse, and we go one better than the ancient fable, for our mouse is still-born.

After forty years' careful study of the question, both by my own work and that done by others, the more I see and learn, the more vast the problem becomes. I am convinced that the Great Author of the Universe, though He created man in His own image, and gave him vast mental powers, as He visibly only endowed him with feeble physical powers compared with His own, so in the realm of mind, He maintains His own supremacy, and while He allows us to learn much, He reserves still more which we cannot fathom, and shows us our own impotence to control the great forces and influences of Nature. On land He gives us much power, and, to encourage industry and other good qualities, He makes the fruits of the earth very much dependent on our exertions and industry; but in the open seas He gives freely of His bounty, and He shows us His own power and goodness and our dependence on Him by making

conditions such that we can neither affect the supply favourably or unfavourably by any effort of ours. Or, to put it in other words, Nature's laboratory or workshop, Old Ocean, where she manufactures the food fishes, &c., is on such a gigantic scale, and the portion our limited powers of mind and body can affect is so infinitesimal, that nothing we can do can seriously affect even this portion. In regard to the larger part, until we are qualified to take the direction of the great forces of Nature out of the hands of the Infinite, it is hopeless to expect we can in any way affect it.

It is an instructive fact that the results of original research, while of fascinating interest to us as naturalists, if they show us one thing more clearly than another, it is our utter helplessness to control matters. Probably no discovery in natural history is more startling in itself, or more conclusive in this respect, than the working out within the last two or three years of the early stages of the life history of our common fresh-water eel, a subject that has puzzled and interested naturalists since Aristotle's time. I quote from Sir John Lubbock's speech at the opening of the International Congress of Zoologists last year at Cambridge:—
 "Until quite recently its life history was absolutely unknown. Aristotle pointed out that 'eels were neither male nor female, and that their eggs were unknown.' This remained true until a year or two ago. No one had ever seen the egg of an eel, or a young eel less than five centimetres ($1\frac{1}{4}$ inch) in

length. We now know, thanks mainly to the researches of Grassi, that the parent eels go down to the sea and breed in the depths of the ocean, in water not less than 3,000 feet in depth. There they adopt a marriage dress of silver, and their eyes considerably enlarge, so as to make the most of the dim light in the ocean depths. Certain small fishes found in the same regions had been regarded as a special family, known as *Leptocephali*; these also were never known to breed. It now appears that they are the larvæ of eels, the one known as *Leptocephalus brevirostris* being the young of our common fresh-water species. When they get to the length of about an inch they change into the tiny eels known as 'elvers,' which swarm in thousands up our rivers. Thus the habits of the eel reverse those of the salmon."

Now, sir, can anything in Nature be more marvellous or more interesting than this? But can anything more clearly show us our utter helplessness to control or affect even so common, so well known, and so accessible a form as the common eel? Even Professor Herdman, I fancy, would hardly propose that we should "wattle off" a portion of the ocean bed 500 fathoms deep and feed *Leptocephalus brevirostris* on "offal" to increase our supply of eels. Again, Professor Herdman's own costly researches into the food of fishes, though they are very incomplete, and as far as they go only comprise investigations made and recorded twenty years since, must convince any practical mind of the utter

impossibility of ever realising his dream of turning sea-fish into domestic animals. Many of the creatures the fish feed upon are more mysterious and more beyond our ken than are the habits and breeds of the fishes themselves. We are not even in the very first stage of understanding them, but from the migrations of the fish and the fluctuations of the fisheries, we see how slight a change in food and surroundings is of vital importance to their welfare. No, sir, Providence knows His own vocation, and exercises His own powers. Happily for us, He provides enough for each, enough for all, enough for evermore, and a free invitation to take as much as we can. Having done so, let us eat with thankful hearts.

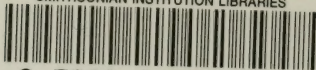
The fishermen have behaved nobly under the suffering they have endured. What other industry or profession would have stood for ten years the arrogant and impertinent meddling of pure scientific faddists? What other body of men would have remained patient and orderly while they saw their industry interfered with by rank outsiders? Which of us would allow our businesses, created entirely by our own unaided skill and energy, to be harassed and controlled by the scientific staff of a college, however eminent, if utterly without practical knowledge?

However, knowledge is increasing, and as soon as the public understand the question, the whole mass of legislation founded on dense ignorance will be swept away, and the

fishermen will once more be permitted to pursue their calling in peace. The group of pure scientists, who have for the last ten years sat with such disastrous results, like Sinbad the Sailor's Old Man of the Sea, on the shoulders of our fishing population, will receive their due reward. When it is understood how great is the darkness in which they have presumed to legislate, posterity will give them a niche in the temple of fame as the fitting representatives at the end of the 19th century of dear worthy, honest, old Dame Partington, the account of whose efforts to hold back the tide with her mop for fear the sea beach should get wet, was one of the joys of our childhood.



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